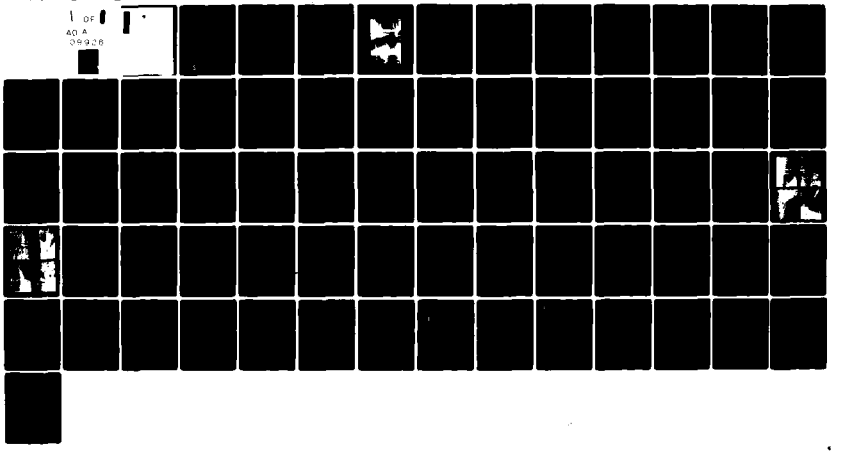
AD-A099 261 D'APPOLONIA CONSULTING ENGINEERS INC PITTSBURGH PA F/G 13/13
NATIONAL DAM INSPECTION PROGRAM. CHAMBERLAIN POND DAM (NDI I.D.--ETC(U)
MAR 81 L D ANDERSEN DACW31-81-C-0014
UNCLASSIFIED NL



PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Department of the Army, Office of Chief of Engineers, Washington, D.C. 20314.

The purpose of a Phase I investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon visual observations and review of available data. Detailed investigations and analyses involving topographic mapping, subsurface investigations, material testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the inspection is intended to identify any need for such studies which should be performed by the owner.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of the dam depends on numerous and constantly changing internal and external factors which are evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the spillway design flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. The spillway design flood provides a measure of relative spillway capacity and serves as an aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

The assessment of the conditions and recommendations was made by the consulting engineer in accordance with generally and currently accepted engineering principles and practices.

PHASE I REPORT
NATIONAL DAM INSPECTION PROGRAM

NAME OF DAM: Chamberlain Pond Dam
STATE LOCATED: Pennsylvania
COUNTY LOCATED: Wyoming
STREAM: Little Mehoopany Creek, tributary of the Susquehanna River
SIZE CLASSIFICATION: Small
HAZARD CLASSIFICATION: High
OWNER: Mr. Robert Witlock
DATE OF INSPECTION: November 12, 1980 and February 4, 1981

ASSESSMENT: Based on the evaluation of the existing conditions, the condition of Chamberlain Pond Dam is considered to be unsafe/nonemergency because of structural deficiencies and seriously inadequate flood discharge capacity. The dam is a dry masonry wall backed by an earth fill. The left abutment nonoverflow section appears to have settled, causing structural cracks in the dam. The stone wall on the downstream side of this section is bulging and tilting downstream. In view of these conditions, the structural stability of the dam is considered to be questionable, requiring further investigation.

The flood discharge capacity of the dam was evaluated according to the recommended criteria and it was found to pass approximately 20 percent of the Probable Maximum Flood (PMF) without overtopping the nonoverflow section of the dam. This capacity is less than the recommended spillway design flood of full PMF. Because the dam cannot pass 50 percent of the PMF and because failure of the dam is considered to significantly increase the downstream damage potential compared to that which would exist just before failure, the flood discharge capacity of the dam is considered to be seriously inadequate.

The following recommendations should be implemented as soon as possible or on a continuing basis.

1. The owner should immediately retain a professional engineer experienced in the design and construction of dams to initiate additional investigations to more accurately ascertain the structural adequacy of the dam to pass the required spillway design flood without distress and to determine the nature and extent of improvements required to provide adequate flood discharge capacity.

2. In conjunction with further evaluation of the dam, causes of the left abutment distress should be investigated and necessary corrective steps taken.

3. The ponded water in the spillway plunge pool should be drained and the toe of the dam should be inspected. Repairs should be performed if the structural

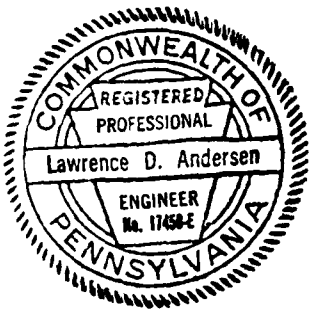
stability of the dam is considered to be affected by the erosion.

4. The structural and operational condition of the outlet works should be evaluated and necessary maintenance performed.

5. Seepage through the dry masonry wall should be monitored and necessary remedial work should be performed if serious seepage conditions develop.

6. Around-the-clock surveillance should be provided during unusually heavy runoff and a formal warning system developed to alert the downstream residents in the event of emergencies.

7. The owner should develop a formal operating and maintenance plan and inspect the dam regularly and perform necessary maintenance.



Lawrence D. Andersen, P.E.
Vice President

March 19, 1981
Date

Approved by:

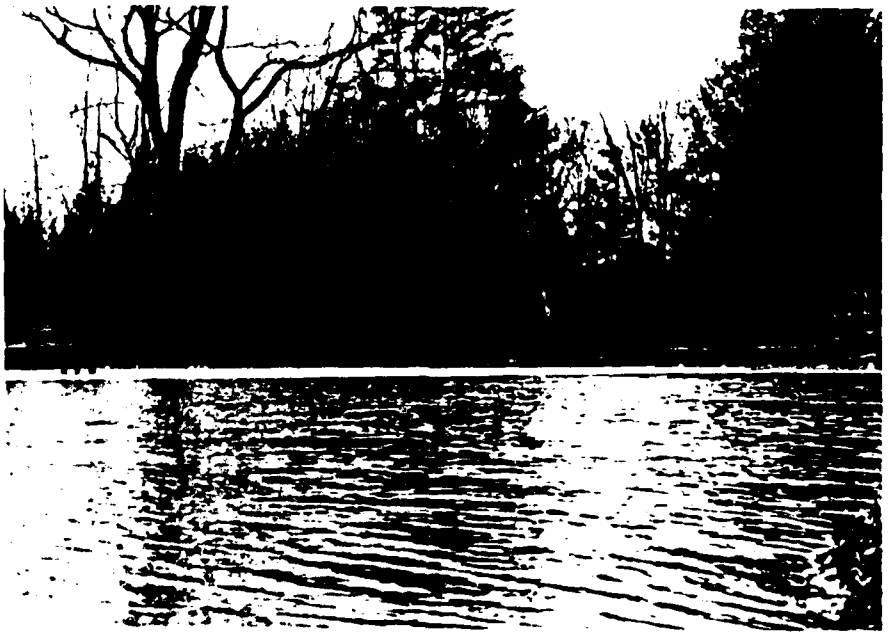
JAMES W. PECK
Colonel, Corps of Engineers
District Engineer

Date 22 APR 81

A

CHAMBERLAIN POND DAM
NDI I.D. PA-0890
DER I.D. 066-011
NOVEMBER 12, 1980

Looking Upstream



Looking Downstream
Overview

TABLE OF CONTENTS

	PAGE
SECTION 1 - PROJECT INFORMATION	1
1.1 General	1
1.2 Description of Project	1
1.3 Pertinent Data	2
SECTION 2 - DESIGN DATA	4
2.1 Design	4
2.2 Construction	4
2.3 Operation	5
2.4 Other Investigations	5
2.5 Evaluation	5
SECTION 3 - VISUAL INSPECTION	6
3.1 Findings	6
3.2 Evaluation	7
SECTION 4 - OPERATIONAL FEATURES	8
4.1 Procedure	8
4.2 Maintenance of the Dam	8
4.3 Maintenance of Operating Facilities	8
4.4 Warning System	8
4.5 Evaluation	8
SECTION 5 - HYDRAULICS AND HYDROLOGY	9
5.1 Evaluation of Features	9
SECTION 6 - STRUCTURAL STABILITY	11
6.1 Evaluation of Structural Stability	11
SECTION 7 - ASSESSMENT AND RECOMMENDATIONS/ PROPOSED REMEDIAL MEASURES	12
7.1 Dam Assessment	12
7.2 Recommendations/Remedial Measures	12

TABLE OF CONTENTS
(Continued)

APPENDIX A - CHECKLIST, VISUAL INSPECTION, PHASE I
APPENDIX B - CHECKLIST, ENGINEERING DATA, DESIGN, CONSTRUCTION, OPERATION, AND HYDROLOGIC AND HYDRAULIC, PHASE I
APPENDIX C - PHOTOGRAPHS
APPENDIX D - HYDROLOGY AND HYDRAULICS ANALYSES
APPENDIX E - PLATES
APPENDIX F - REGIONAL GEOLOGY

PHASE I REPORT
NATIONAL DAM INSPECTION PROGRAM
CHAMBERLAIN POND DAM
NDI I.D. PA-0890
DER I.D. 066-011

SECTION 1
PROJECT INFORMATION

1.1 General

a. Authority. The inspection was performed pursuant to the authority granted by The National Dam Inspection Act, Public Law 92-367, to the Secretary of the Army, through the Corps of Engineers, to conduct inspections of dams throughout the United States.

b. Purpose. The purpose of this inspection is to determine if the dam constitutes a hazard to human life or property.

1.2 Description of Project

a. Dam and Appurtenances. Chamberlain Pond Dam consists of a dry masonry wall approximately 100 feet long with a maximum height of 18 feet above the downstream toe of the dam and a crest width of 6 feet. Available records indicate that an earth fill has been placed against the upstream side of the dam to a level approximately three to four feet below the level of the overflow section. It appears that in conjunction with this work a concrete slab was placed on top of the overflow section and abutments and a concrete cutoff wall was constructed against the upstream face of the old wall.

A central overflow section 63 feet wide and approximately 4 feet deep constitutes the flood discharge facilities of the dam. Discharge over this section flows into a plunge pool at the toe of the dam and downstream into the natural stream channel. The outlet works appears to be a two-foot-diameter cast-in-place concrete conduit controlled by a gate on the upstream end. The gate is operated by a stem supported by a steel structure extending above the reservoir water level. This outlet system is the emergency drawdown facility for the dam.

b. Location. Chamberlain Pond Dam is located (N41° 39.9', W76° 09.0') on Little Mehoopany Creek, less than one-half mile west of the town of Jenningsville in Windham Township, Wyoming County, Pennsylvania. Plate 1 illustrates the location of the dam.

c. Size Classification. Small (based on 18-foot height and 562 acre-feet storage capacity at maximum pool).

d. Hazard Classification. The dam is classified to be in the high hazard category. Downstream from the dam, Little Mehoopany Creek flows through the town of Jenningsville, then discharges into Jennings Pond (NDI I.D. PA-0891) at a distance of approximately one mile below the dam. Below Chamberlain Pond Dam, approximately five houses, one church, and one general store are considered to be within the potential flood-plain of Little Mehoopany Creek. It is estimated that failure of Chamberlain Pond Dam would cause loss of more than a few lives and appreciable property damage in this area and would potentially result in failure of Jennings Pond Dam.

e. Ownership. Mr. Robert Witlock, R.D. #2, Box 322, Mehoopany, Pennsylvania 18629.

f. Purpose of Dam. Recreation.

g. Design and Construction History. No information is available on design and construction of the dam. The dam was first inspected by the Commonwealth of Pennsylvania in 1919.

h. Normal Operating Procedure. The reservoir is normally maintained at the crest level of the spillway, Elevation 1055. The inflow occurring when the lake is at or above the spillway crest level is discharged through the uncontrolled spillway.

1.3 Pertinent Data. Elevations referred to in this and subsequent sections of the report were calculated based on field measurements assuming the spillway crest to be at Elevation 1055 (USGS Datum) which is the normal pool elevation shown on the USGS 7.5-minute Jenningsville quadrangle.

a. Drainage Area	5.7 square miles
b. Discharge at Dam Site (cfs)	
Maximum known flood at dam site	Unknown
Outlet conduit at maximum pool	Unknown
Gated spillway capacity at maximum pool	Not applicable
Ungated spillway capacity at maximum pool	1360
Total spillway capacity at maximum pool	1360
c. Elevation (USGS Datum) (feet)	
Top of dam	1058.7 (low spot on left abutment)
Maximum pool	1058.7
Normal pool	1055.0
Upstream invert outlet works	Unknown
Downstream invert outlet works	1044.1
Maximum tailwater	Unknown
Toe of dam	1041±

d. Reservoir Length (feet)

Normal pool level	3400
Maximum pool level	3475

e. Storage (acre-feet)

Normal pool level	357
Maximum pool level	562

f. Reservoir Surface (acres)

Normal pool level	48.7
Maximum pool level	62.2

g. Dam

Type	Dry masonry wall
Length	100± feet
Height	18 feet
Top width	Varies, 5 feet to 6 feet
Side slopes	Downstream: Vertical Upstream: Not visible
Zoning	Not applicable
Impervious core	Not applicable
Cutoff	Concrete wall(1)
Grout curtain	Unknown

h. Regulating Outlet

Type	20-inch pipe (appears to be cast-in-place concrete)
Length	Unknown
Closure	Gate valve
Access	Gate stem extending above water surface
Regulating facilities	Gate valve

i. Spillway

Type	Overflow section
Length	62 feet (perpendicular to flow)
Crest elevation	1055.0 feet
Upstream channel	Lake
Downstream channel	Natural streambed

(1) A postconstruction modification. Extent of penetration of the wall into the foundation is unknown.

SECTION 2
DESIGN DATA

2.1 Design

a. Data Available. The available data consist of files provided by the Commonwealth of Pennsylvania, Department of Environmental Resources (PennDER) which contain correspondence and inspection reports.

(1) Hydrology and Hydraulics. No design information is available.

(2) Dam. Available information consists of past inspection reports and correspondence.

(3) Appurtenant Structures. No design information is available.

b. Design Features

(1) Dam. No information is available on the design of the dam. Based on field observations, the dam is a dry masonry wall with earth fill on the upstream side. The wall is approximately 100 feet long with a maximum height of 18 feet above the downstream toe and a crest width of 6 feet.

(2) Appurtenant Structures. The appurtenant structures consist of a spillway which is the central low section of the dam and outlet works. The spillway is a concrete overflow section with a length of 62 feet and a 6-foot crest width. A 3.7-foot freeboard exists between the spillway crest and top of the dam.

The outlet works appear to consist of a 20-inch cast-in-place concrete conduit controlled by a gate on the upstream end. A gate stem supported by a steel structure is used to manually operate the valve.

c. Design Data

(1) Hydrology and Hydraulics. No design data are available.

(2) Embankment. No engineering data are available on the design of the embankment.

(3) Appurtenant Structures. No design information is available on the appurtenant structures.

2.2 Construction. No information is available on construction of the dam. In 1941, the concrete slab and cutoff wall described in Section 1.2 a were constructed and earth fill was placed against the upstream face to a level three to four feet below the spillway crest.

2.3 Operation. It is reported that there are no formal operating records maintained for the dam.

2.4 Other Investigations. None.

2.5 Evaluation

a. Availability. The available information was provided by PennDER.

b. Adequacy. No design and construction information is available to assess the adequacy of the design and construction of the dam and the appurtenant structures.

SECTION 3
VISUAL INSPECTION

3.1 Findings

a. General. The onsite inspection of Chamberlain Pond Dam consisted of:

1. Visual inspection of the embankment, abutments, and embankment toe.

2. Visual examination of the spillway and the visible portions of the outlet works.

3. Evaluation of the downstream area hazard potential.

The specific observations are illustrated in Plate 2.

b. Dam. The general inspection of the dam consisted of searching for indications of structural distress, such as cracks, subsidence, bulging, wet areas, seeps, and observing general maintenance conditions, erosion, and other surficial features.

In general, the condition of the dam is considered to be poor. Structural cracks were observed on the crest and on the upstream face of the left abutment nonoverflow section. In addition, the crest has settled and the masonry wall is bulging downstream at this location. The left abutment nonoverflow section appears to be tilting downstream. Flow over the spillway appears to be eroding the toe of the dam. Seepage through the dry masonry wall was observed in an area between the toe and a level six feet below the spillway crest with an estimated flow rate of 10 to 20 gpm.

The crest of the dam was surveyed relative to the spillway crest elevation and it was found that the low spot on the crest is the left abutment area. The profile of the embankment is relatively uniform and is illustrated in Plate 3. The available freeboard is 3.7 feet from the normal pool level to the top of the dam.

c. Appurtenant Structures. The spillway structure was examined for deterioration or other signs of distress that would limit flow. In general, the spillway structure, which consists of the overflow section of the dam was found to be in poor condition.

The only visible portion of the outlet works was the downstream end in the outlet pipe, the gate stem, and the supporting structure. The steel structure which supports the gate stem was observed to be severely corroded near the normal pool level. No other portion of the facility was visible and operation of the outlet works was not observed.

d. Reservoir Area. Chamberlain Pond Dam watershed includes two dams. The Negro Pond Dam (NDI I.D. PA-0889) which impounds a reservoir with a surface area of 81 acres at normal pool is located at the upstream end of the Chamberlain Pond Dam reservoir. One and one-half miles upstream of Negro Pond is Sharpe's Pond Dam (NDI I.D. PA-0888). Sharpe's Pond Dam impounds a reservoir with a surface area of 45 acres at normal pool level.

A map review indicates that the watershed is predominantly covered by woodlands. A review of the regional geology is included in Appendix F.

e. Downstream Channel. Below the dam is Little Mehoopany Creek which flows through the town of Jenningsville and into Jennings Pond at a distance of 0.8 mile below the dam. Jennings Pond Dam is a nine-foot high dry masonry structure and impounds a reservoir with a 37-acre surface area at normal pool. A further description of the downstream conditions is included in Section 1.2 d.

3.2 Evaluation. The condition of the dam is considered to be poor. The left abutment nonoverflow section shows significant signs of distress, consisting of structural cracks on the upstream side, subsidence on the crest and downstream bulging of the stone wall, which cause concern as to the continued stability of the dam. Ponded water along the toe of the dam suggests that erosion may have occurred at the toe of the dam which may also affect the structural stability. A general seepage was observed through the dam starting from a level about six feet below spillway crest.

The outlet pipe gate stem and supporting structure have severely corroded and the gate does not appear to be functional. In view of these conditions, the dam is considered to be in need of further evaluation by a professional engineer to prepare plans for general repair and restoration.

SECTION 4
OPERATIONAL FEATURES

4.1 Procedure. There are no formal operating procedures for the dam. The reservoir is normally maintained at the uncontrolled spillway crest level, with excess inflow discharging through the broad-crested overflow section.

4.2 Maintenance of the Dam. The maintenance of the dam is considered to be poor. It appears that no attempts are being made to maintain the dam.

4.3 Maintenance of Operating Facilities. The outlet pipe gate stem and the supporting structure have severely corroded, and the facility appears to be not functional.

4.4 Warning System. No formal warning system exists for the dam. Telephone communication facilities are available via several residences one-quarter mile downstream from the dam.

4.5 Evaluation. The maintenance condition of the dam and the operating facilities is considered to be poor. The dam and the appurtenant structures are in need of overall repair and restoration.

SECTION 5
HYDRAULICS AND HYDROLOGY

5.1 Evaluation of Features

a. Design Data. Chamberlain Pond Dam has a watershed area of 5.7 square miles and impounds a reservoir with a surface area of 48.7 acres at normal pool level. The flood discharge facilities consist of the 62-foot-wide overflow section of the dam. The capacity of the spillway was determined to be 1360 cfs, based on the available 3.7-foot freeboard relative to the low spot on the left abutment.

b. Experience Data. As previously stated, Chamberlain Pond Dam is classified as a small dam in the high hazard category. Under the recommended criteria for evaluating emergency spillway discharge capacity, such impoundments are required to pass one-half to full PMF. In view of the high downstream damage potential, the full PMF is selected as the spillway design flood.

The PMF inflow hydrograph for the reservoir was determined utilizing the Dam Safety Version of the HEC-1 computer program developed by the Hydrologic Engineering Center of the U.S. Army, Corps of Engineers. Data used for the computer analysis are presented in Appendix D. The inflow hydrographs were found to have peak flows of 12,524 and 5755 cfs for full and 50 percent of PMF, respectively. Computer input and summary of computer output are also included in Appendix D.

c. Visual Observations. On the date of inspection, no conditions were observed that would indicate the capacity of the spillway would be significantly reduced in the event of a flood. As described in Section 3.1 d, there are two dams upstream of Chamberlain Pond Dam. Flood hydrographs for this dam were developed including the storage effect of the upstream dams. Review of the storage capacity of the upstream dams under normal pool conditions in relation to the surcharge storage capacity of this dam indicates that failure of the upstream dams under normal pool conditions is not likely to result in failure of Chamberlain Pond Dam.

d. Overtopping Potential. Various percentages of the PMF inflow hydrograph were routed through the upstream reservoirs and through the Chamberlain Pond Dam reservoir. The analyses indicate that Chamberlain Pond Dam spillway can pass approximately 20 percent of the PMF without overtopping the dam. At 50 percent of PMF, the dam would be overtopped by a depth of 3.9 feet for a duration of 7.4 hours. Under the full PMF, the dam would be overtopped by a depth of 8.0 feet for 9.8 hours. It is estimated that overtopping of the nonoverflow sections by two feet would likely result in failure of the dam.

e. Spillway Adequacy. Because the spillway cannot pass the recommended design flood of full PMF without overtopping the dam, the spillway is classified to be inadequate according to the recommended criteria.

A breach analysis was conducted to determine whether failure resulting from overtopping would significantly increase the loss of life or property damage downstream over that which would exist just before overtopping failure. For the breach analysis, it was assumed that the breach would initiate when the nonoverflow sections overtopped by two feet and that the entire dam would be removed in 0.6 hours. Review of the flood stages in Jenningsville (about one-quarter mile downstream) before and after failure indicates that flood stages would be raised by about four feet due to dam failure. The four-foot increase in flood stage in the Jenningsville area is considered to cause a significant increase in the potential loss of life and property damage. Therefore, the spillway is classified to be seriously inadequate.

SECTION 6
STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability

a. Visual Observations

(1) Dam. As discussed in Section 3, the dam was found to be in poor condition. In view of structural cracking, signs of settlement, bulging and downstream tilting of the dam near the left abutment, continued stability of the dam is questionable. Apparent erosion in the plunge pool along the toe of the dam may also affect the overall stability.

(2) Appurtenant Structures. Only the downstream end of the outlet pipe was visible, therefore, no conclusions were reached as to the structural adequacy of this facility.

b. Design and Construction Data

(1) Dam. Available design and construction information does not provide any quantitative data to aid in the assessment of stability. Based on visual observations, the static stability of the dam is considered to be questionable.

(2) Appurtenant Structures. No design and construction data are available for the appurtenant structures.

c. Operating Records. None maintained.

d. Postconstruction Changes. The postconstruction changes are described in Section 1.2 a.

e. Seismic Stability. The dam is located in Seismic Zone 1, and based on visual observations, the static stability of the dam is considered to be questionable. Therefore, seismic stability should be assessed in conjunction with static stability assessment.

SECTION 7
ASSESSMENT AND RECOMMENDATIONS/PROPOSED REMEDIAL MEASURES

7.1 Dam Assessment

a. Assessment. The visual observations indicate that Chamberlain Pond Dam is in poor condition. Further, in view of various structural deficiencies and seriously inadequate spillway capacity, the condition of the dam is classified to be unsafe/nonemergency. The left abutment nonoverflow section appears to have settled, causing structural cracks in the dam. The stone wall on the downstream side of this section is bulging and tilting downstream. In view of these conditions, stability of the dam is considered to be questionable, requiring further investigation and preparation of plans for repair and restoration. Operating equipment was also found to be in poor condition, requiring repairs.

Spillway capacity was evaluated according to the recommended procedure and was found to be approximately 20 percent of the PMF without overtopping the nonoverflow section of the dam. This capacity is less than the recommended spillway capacity of full PMF according to the size and hazard classification for this dam. Therefore, the flood discharge capacity is classified to be inadequate. Further, because the spillway cannot pass 50 percent of the PMF without overtopping nonoverflow sections and since failure of the dam is considered to significantly increase the downstream damage potential, the flood discharge capacity is classified to be seriously inadequate.

b. Adequacy of Information. The available information, in conjunction with the visual observations, is considered sufficient to make a Phase I evaluation.

c. Urgency. The following recommendations should be implemented immediately or on a continuing basis.

d. Necessity for Additional Investigation. In view of the inadequate spillway capacity and poor condition of the dam, the owner should immediately initiate additional investigations to more accurately ascertain the condition of the dam and the extent of improvements required to provide adequate discharge capacity.

7.2 Recommendations/Remedial Measures

It is recommended that:

1. The owner should immediately retain a professional engineer experienced in the design and construction of dams to initiate additional investigations to more accurately ascertain the structural adequacy of the dam to pass the required spillway design flood without distress and to determine the nature and

extent of improvements required to provide adequate flood discharge capacity.

2. In conjunction with further evaluation of the dam, causes of the left abutment distress should be investigated and necessary corrective steps taken.

3. The ponded water in the spillway plunge pool should be drained and the toe of the dam should be inspected. Repairs should be performed if the structural stability of the dam is considered to be affected by the erosion.

4. The structural and operational condition of the outlet works should be evaluated and necessary maintenance performed.

5. Seepage through the dry masonry wall should be monitored and necessary remedial work should be performed if serious seepage conditions develop.

6. Around-the-clock surveillance should be provided during unusually heavy runoff and a formal warning system developed to alert the downstream residents in the event of emergencies.

7. The owner should develop a formal operating and maintenance plan and inspect the dam regularly and perform necessary maintenance.

APPENDIX A

CHECKLIST
VISUAL INSPECTION
PHASE I

APPENDIX A

CHECKLIST
VISUAL INSPECTION
PHASE I

NAME OF DAM Chamberlain Pond COUNTY Wyoming STATE Pennsylvania ID# NDI: PA-0890 DER: 066-011

TYPE OF DAM Masonry HAZARD CATEGORY High

DATE(S) INSPECTION November 12, 1980 WEATHER Cloudy TEMPERATURE 30's

POOL ELEVATION AT TIME OF INSPECTION 1053.7 M.S.L. TAILWATER AT TIME OF INSPECTION 1044.2 M.S.L.

INSPECTION PERSONNEL:	REVIEW INSPECTION PERSONNEL: (February 4, 1981)
Douglas Cosler	Lawrence D. Andersen
Arthur Smith	James H. Poellot
Bilgin Erel	Bilgin Erel

Owner's Representative:

Robert Witlock (Owner)

Bilgin Erel RECORDER

VISUAL INSPECTION
PHASE I
CONCRETE/MASONRY DAMS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
ANY NOTICEABLE SEEPAGE	Seepage was observed flowing through the dry masonry wall between the base of the wall and six feet below the spillway crest.	
STRUCTURE TO ABUTMENT/EMBANKMENT JUNCTIONS	At the left abutment, there is a large crack in the top slab and bulging of the wall. A crack also exists in the mortar on the upstream face of the left abutment.	
DRAINS	None found.	
WATER PASSAGES	No passages other than the seepage area described above.	
FOUNDATION	No perceivable sign of distress.	

VISUAL INSPECTION
PHASE I
CONCRETE/MASONRY DAMS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS CONCRETE SURFACES	The top slab and mortared upstream face of the left abutment are cracked and the slab has settled.	
STRUCTURAL CRACKING	See above comments.	
VERTICAL AND HORIZONTAL ALIGNMENT	A section approximately 20 feet long on the left half of the dam appears to have tilted downstream. See Plate 3 for the dam crest profile.	
MONOLITH JOINTS	Dry masonry dam, N/A.	
CONSTRUCTION JOINTS	(No construction joints.)	
STAFF GAGE OF RECORDER:	None found.	

VISUAL INSPECTION
PHASE I
OUTLET WORKS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	The outlet conduit appears to be a 20-inch-diameter cast-in-place concrete conduit. Not accesible for closer inspection.	
INTAKE STRUCTURE	Submerged. Only the stem and the steel structure supporting the stem is visible. The steel structure is severely corroded.	The intake structure should be repaired.
OUTLET STRUCTURE	None	
OUTLET CHANNEL	Outlet pipe would discharge into the spillway plunge pool.	
EMERGENCY GATE	According to the owner, the gate has never been operated since he acquired the dam about 13 years ago.	The owner should evaluate the operational condition of the outlet pipe gate and make necessary repairs to restore the outlet facilities.

VISUAL INSPECTION
PHASE I
UNGATED SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE WEIR	The concrete slab on the overflow section of the dam is in good condition.	
APPROACH CHANNEL	Lake. Free of debris that can affect the spillway capacity.	
DISCHARGE CHANNEL	The flow from the spillway appears to be eroding the toe of the dam.	Ponded water at the spillway plunge pool should be drained and the toe of the dam should be inspected. Repairs should be performed, if required.
BRIDGE AND PIERS	None	

VISUAL INSPECTION
PHASE I
GATED SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE SILL	(The dam has no gated spillway.)	
APPROACH CHANNEL	N/A	
DISCHARGE CHANNEL	N/A	
BRIDGE PIERS	N/A	
GATES AND OPERATION EQUIPMENT	N/A	

VISUAL INSPECTION
PHASE I
INSTRUMENTATION

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
MONUMENTATION/SURVEYS	None	
OBSERVATION WELLS	None	
WEIRS	None	
PIEZOMETERS	None	
OTHER	None	

VISUAL INSPECTION
PHASE I
RESERVOIR

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	No problems observed.	
SEDIMENTATION	Sedimentation condition in the lake is unknown.	
UPSTREAM RESERVOIRS	There are two upstream reservoirs: Negro Pond, DER I.D.: 066-010 Sharpe's Pond, DER I.D.: 066-009	

VISUAL INSPECTION
PHASE I
DOWNSTREAM CHANNEL

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	No problems observed.	
SLOPES	No problems observed.	
APPROXIMATE NUMBER OF HOMES AND POPULATION	Five houses, one church, and one general store are considered to be within the potential floodplain of Little Mehoopany Creek in the event of a dam failure. Population (approximately) = 30.	

APPENDIX B

CHECKLIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
AND HYDROLOGIC AND HYDRAULIC
PHASE I

APPENDIX B

CHECKLIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE I

NAME OF DAM Chamberlain Pond

ID# NDI: PA-0890
DER: 066-011

ITEM	REMARKS
AS-BUILT DRAWINGS	No drawings available.
REGIONAL VICINITY MAP	See Plate 1.
CONSTRUCTION HISTORY	Not reported.
TYPICAL SECTIONS OF DAM	Not available.
OUTLETS - PLAN - DETAILS - CONSTRAINTS - DISCHARGE RATINGS	Not available.

CHECKLIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE I

ITEM	REMARKS
RAINFALL/RESERVOIR RECORDS	None available.
DESIGN REPORTS	None available.
GEOLOGY REPORTS	No geology information reported.
DESIGN COMPUTATIONS HYDROLOGY & HYDRAULICS DAM STABILITY SEEPAGE STUDIES	No computations reported.
MATERIALS INVESTIGATIONS BORING RECORDS LABORATORY FIELD	None available.

CHECKLIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE I

ITEM	REMARKS
POST CONSTRUCTION SURVEYS OF DAM	None reported.
BORROW SOURCES	None
MONITORING SYSTEMS	None
MODIFICATIONS	In 1941, a concrete slab was placed on top of the old spillway crest (stone), and the top portions of the masonry abutments were relaid in mortar. A concrete cutoff wall was placed against the upstream face of the old wall and an earth fill was placed against the upstream face of the masonry.
HIGH POOL RECORDS	No records available.

CHECKLIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE I

ITEM	REMARKS
POST CONSTRUCTION ENGINEERING STUDIES AND REPORTS	None available.
PRIOR ACCIDENTS OR FAILURE OF DAM DESCRIPTION REPORTS	None available.
MAINTENANCE OPERATION RECORDS	No records reported.
SPILLWAY PLAN SECTIONS DETAILS	Not available.
OPERATING EQUIPMENT PLANS AND DETAILS	None available.

CHECKLIST
ENGINEERING DATA
HYDROLOGIC AND HYDRAULIC

DRAINAGE AREA CHARACTERISTICS: 5.7 square miles (wooded)

ELEVATION, TOP OF NORMAL POOL AND STORAGE CAPACITY: 1055.0 (357 acre-feet)

ELEVATION, TOP OF FLOOD CONTROL POOL AND STORAGE CAPACITY: 1058.7 (562 acre-feet)

ELEVATION, MAXIMUM DESIGN POOL: 1058.7 (design pool unknown)

ELEVATION, TOP OF DAM: 1058.7 (low spot on left abutment)

SPILLWAY:

a. Elevation 1055.0

b. Type Rectangular concrete overflow section

c. Width 62 feet (perpendicular to flow)

d. Length 6 feet (width of spillway crest)

e. Location Spillover Near left abutment

f. Number and Type of Gates None

OUTLET WORKS:

a. Type 20-inch pipe (appears to be cast-in-place concrete)

b. Location Between left abutment and center of spillway

c. Entrance Inverts Not available

d. Exit Inverts 1044.1

e. Emergency Drawdown Facilities 20-inch pipe

HYDROMETEOROLOGICAL GAGES:

a. Type No gages

b. Location N/A

c. Records None

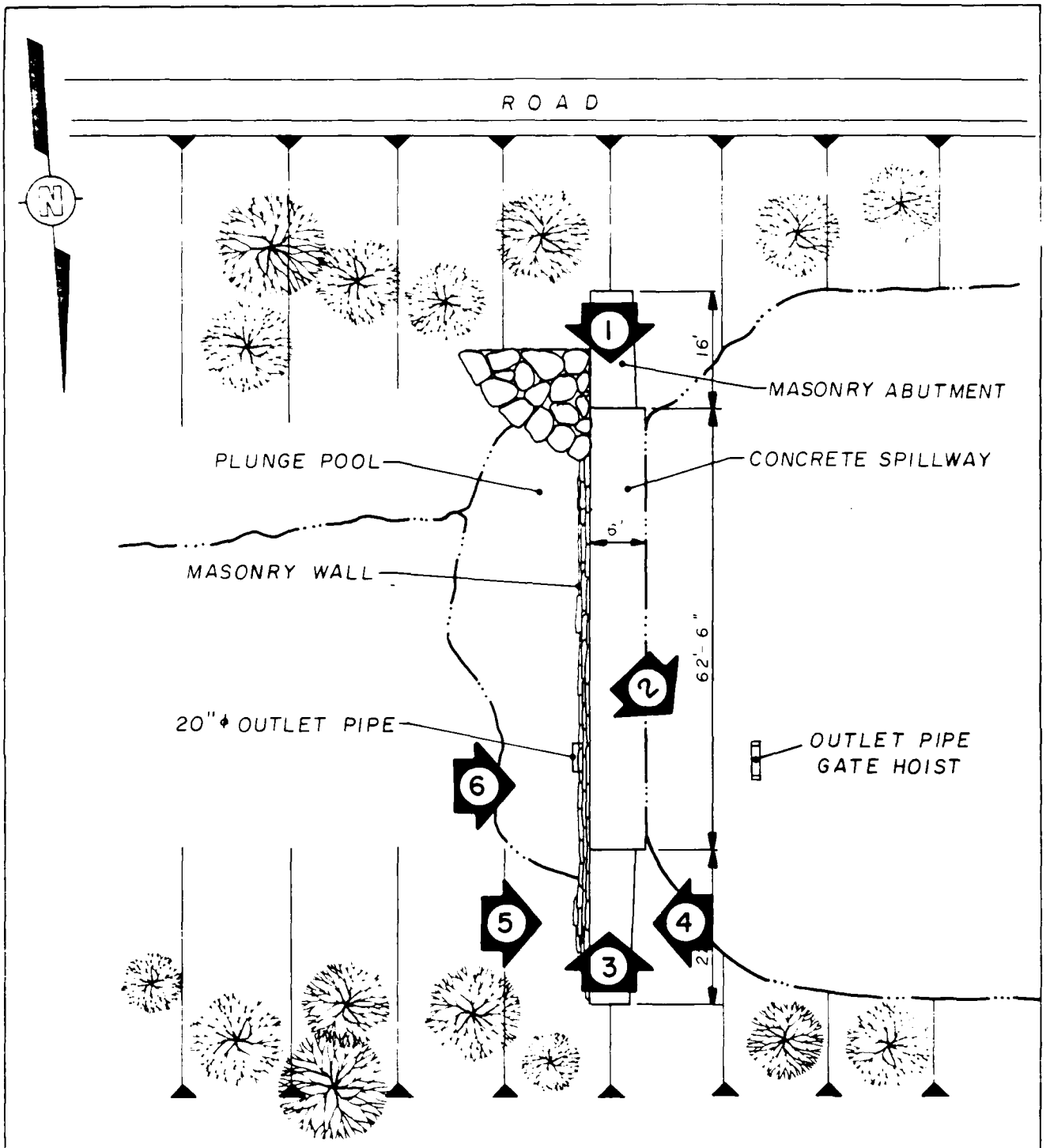
MAXIMUM NONDAMAGING DISCHARGE: Spillway capacity (1360 cfs)

APPENDIX C

PHOTOGRAPHS

LIST OF PHOTOGRAPHS
CHAMBERLAIN POND DAM
NDI I.D. NO. PA-0890
NOVEMBER 12, 1980

PHOTOGRAPH NO.	DESCRIPTION
1	Crest (looking north).
2	Outlet pipe gate stem (note corrosion).
3	Crest (looking south).
4	Crack in concrete left abutment (upstream face).
5	Left abutment distress (downstream face).
6	Outlet pipe (downstream end).
7 & 8	Houses at Jenningsville (mile 0.5).



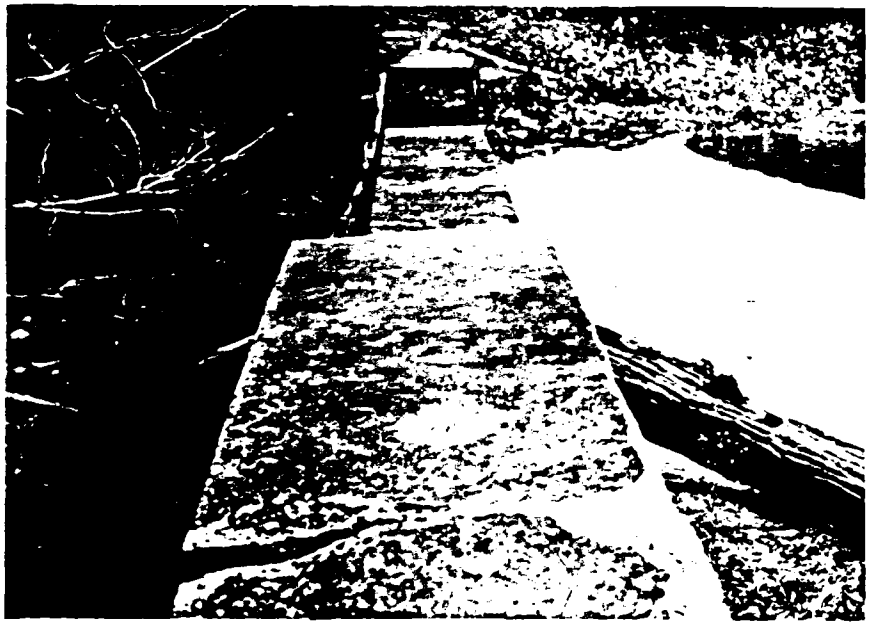
CHAMBERLAIN POND DAM
KEY PLAN OF PHOTOGRAPHS
FIELD INSPECTION DATE NOV. 12, 1980

DAPPOLONIA

NOT TO SCALE

PHOTOGRAPH NO 1

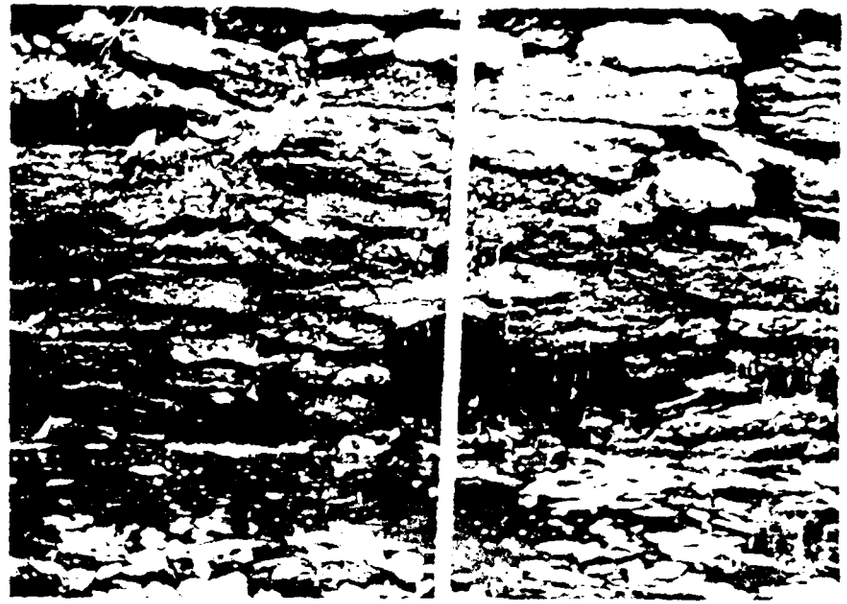
PHOTOGRAPH NO 2



PHOTOGRAPH NO 3

PHOTOGRAPH NO 4

PHOTOGRAPH NO 5



PHOTOGRAPH NO. 6

PHOTOGRAPH NO 7

PHOTOGRAPH NO 8

APPENDIX D

HYDROLOGY AND HYDRAULICS ANALYSES

HYDROLOGY AND HYDRAULIC ANALYSIS
DATA BASE

NAME OF DAM: Chamberlain Pond Dam

PROBABLE MAXIMUM PRECIPITATION (PMP) = 22.2 INCHES/24 HOURS

STATION	1	2	3	4	5
Station Description	Sharpe's Pond Reservoir	Sharpe's Pond Dam	4-Foot-Diameter Road Culvert	Negro Pond Reservoir	Negro Pond Dam
Drainage Area (square miles)	0.99	-	-	3.78	-
Cumulative Drainage Area (square miles)	0.99	0.99	0.99	4.77	4.77
Adjustment of PMF for Drainage Area (%)[1]	97%			97%	
6 Hours	117	-	-	117	-
12 Hours	127	-	-	127	-
24 Hours	136	-	-	136	-
48 Hours	145	-	-	145	-
72 Hours	-	-	-	-	-
Snyder Hydrograph Parameters					
Zone[2]	11	-	-	11	-
C_p/C_t[3]	0.62/1.5	-	-	0.62/1.5	-
L (miles)[4]	1.23	-	-	3.31	-
L_{ca} (miles)[4]	0.44	-	-	0.95	-
$t_p = C_t(L \cdot L_{ca})^{0.3}$ (hours)	1.24	-	-	2.11	-
Spillway Data					
Crest Length (ft)	-	94 perimeter length	See road culvert capacity calculations	-	Dam has no spillway
Freeboard (ft)	-	1.2		-	
Discharge Coefficient	-	Varies		-	
Exponent	-	1.5		-	

[1] Hydrometeorological Report 40, U.S. Weather Bureau, 1965.
[2] Hydrological zone defined by Corps of Engineers, Baltimore District, for determining Snyder's Coefficients (C_p and C_t).
[3] Snyder's Coefficients.
[4] L = Length of longest water course from outlet to basin divide.
L_{ca} = Length of water course from outlet to point opposite the centroid of drainage area.

STORAGE VS. ELEVATION

ELEVATION	ΔH, FEET	AREA (acres)[1]	ΔVOLUME (acre-feet)[2]	STORAGE (acre-feet)
1080.0		104.7		2347.7
	20		1703.0	
1060.0		67.0		644.7
	5		288.0	
1055[3] (Normal pool elevation)		48.7	356.7[3]	356.7
	14			
1041.0 (Reservoir bottom El.)		8.0		0

[1] Planimetered from USGS maps.
[2] $\Delta Volume = \Delta H/3 \, (A_1 + A_2 + \sqrt{A_1 A_2})$.
[3] Estimated normal pool storage capacity.

NAME OF DAM: Chamberlain Pond Dam (continued)

PROBABLE MAXIMUM PRECIPITATION (PMP) = _____ INCHES/24 HOURS

STATION	6	7	8	9	10
Station Description	Chamberlain Pond Reservoir	Chamberlain Pond Dam	Little Mehoopany Creek	Jennings Pond Dam	
Drainage Area (square miles)	0.90	-	-	-	
Cumulative Drainage Area (square miles)	5.67	5.67	5.67	5.67	
Adjustment of PMF for Drainage Area (%)(1)	97%				
6 Hours	117	-	-	-	
12 Hours	127	-	-	-	
24 Hours	136	-	-	-	
48 Hours	145	-	-	-	
72 Hours	-	-	-	-	
Snyder Hydrograph Parameters					
Zone(2)	11	-	-	-	
C_p/C_t(3)	0.62/1.5	-	-	-	
L (miles)(4)	1.33	-	-	-	
L_{ca} (miles)(4)	0.47	-	-	-	
$t_p = C_t(L \cdot L_{ca})^{0.3}$ (hours)	1.30	-	-	-	
Spillway Data					
Crest Length (ft)	-	62.0	-	61.0	
Freeboard (ft)	-	3.7	-	2.4	
Discharge Coefficient	-	3.08	-	3.08	
Exponent	-	1.5	-	1.5	

(1) Hydrometeorological Report 40, U.S. Weather Bureau, 1965.
(2) Hydrological zone defined by Corps of Engineers, Baltimore District, for determining Snyder's Coefficients (C_p and C_t).
(3) Snyder's Coefficients.
(4) L = Length of longest water course from outlet to basin divide.
L_{ca} = Length of water course from outlet to point opposite the centroid of drainage area.

STORAGE VS. ELEVATION

ELEVATION	ΔH, FEET	AREA (acres)(1)	ΔVOLUME (acre-feet)(2)	STORAGE (acre-feet)

(1) Planimetered from USGS maps.
(2) $\Delta Volume = \Delta H/3 \ (A_1 + A_2 + \sqrt{A_1 A_2})$.

```
**********
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION      JULY 1978
  LAST MODIFICATION  31 APR 80
**********
    1                A1       SNYDER HYDROGRAPH,OVERTOPPING,DAMBREACH,AND D/S CHANNEL ROUTING ANALYSES
    2                A2       CHAMBERLAIN POND DAM (DER 66-11) WYOMING COUNTY,PA. PROJECT NO.80-556-05
    3                A3       FOR 20%,30%,40%,50%,60%,70%,80%,90%,AND 100% PROBABLE MAXIMUM FLOOD(PMF)
    4                B     266        0       12        0        0        0        0        0       -4        0
    5                B1      5
    6                J       2        9        1
    7                J1   0.20     0.30     0.40     0.50     0.60     0.70     0.80     0.90     1.00
    8                K       0        1                                                   1
    9                K1       CALCULATION OF SNYDER INFLOW HYDROGRAPH TO SHARPE'S POND,(DER 66-09)
   10                M       1        1     0.99             5.67                                      1
   11                P                21.5      117      127      136      145
   12                T                                                             1.0      0.5             0.0709
   13                W    1.24     0.62
   14                X    -1.5    -0.05      2.0
   15                K       1        2                                                   1
   16                K1       ROUTING FLOW THROUGH SHARPE'S POND,(DER 66-09)
   17                Y                                         1        1
   18                Y1      1                                                  -1135.0       -1
   19                Y41135.0  1135.2   1135.4   1135.6   1135.8   1136.0 1136.13   1137.0   1138.0   1138.5
   20                Y41139.0 1139.54   1140.0   1141.0   1142.0   1143.0
   21                YS   0.00      2.7      7.6     14.0     21.6     30.2     36.2     48.1     59.0     65.7
   22                YS   68.1     72.5     73.3     75.0     76.7     78.3
   23                SA   45.0     56.0     99.2
   24                SE1135.0  1140.0   1160.0
   25                SS1135.0
   26                SD1136.1     2.65      1.5    525.0
   27                SL  100.0    150.0    200.0    250.0    300.0    350.0    450.0    475.0    513.0    525.0
   28                SV1136.1  1136.2   1136.5   1136.9   1137.0   1137.1   1137.2   1137.4   1139.2   1141.3
   29                K       1        3                                                   1
   30                K1       ROUTING FLOW THROUGH 4 FEET DIAM. CULVERT.  HOMES AT ELEVATION 1105
   31                Y                                         1        1
   32                Y1      1                                                  -1100.0       -1
   33                Y41100.0  1101.0   1102.0   1103.0   1104.0   1105.0   1106.0   1107.0   1108.0   1109.0
   34                Y41110.0  1112.0   1114.0   1116.0   1118.0   1120.0   1122.0   1124.0
   35                YS    0.0     10.0     23.0     46.0     72.0     95.0    117.0    132.0    146.0    158.0
   36                YS  170.0    191.0    210.0    227.0    243.0    259.0    275.0    286.0
   37                SA    0.9      4.6     18.4
   38                SE1100.0  1120.0   1140.0
   39                SS1100.0
   40                SD1120.0     2.65      1.5    400.0
   41                K       0        4                                                   1
   42                K1       CALCULATION OF SNYDER INFLOW HYDROGRAPH TO NEGRO POND,(DER 66-10)
   43                M       1        1     3.78             5.67                                      1
   44                P                21.5      117      127      136      145
   45                T                                                             1.0      0.5             0.0735
   46                W    2.11     0.62
   47                X    -1.5    -0.05      2.0
   48                K       2        4                                                   1
   49                K1       COMBINED INFLOW HYDROGGRAPH TO NEGRO POND,(DER 66-10)
   50                K       1        5                                                   1
```

```
K1      ROUTING FLOW THROUGH NEGRO POND,(DER 66-11)
Y                                       1       1
Y1    1                                                 -1063.6
$A  17.0    80.8   164.4   247.0
$E1057.0  1063.6  1080.0  1100.0
$$1063.6   0.001    0.01     1.5
$D1063.7    2.65     1.5   325.0
$L  25.0    40.0    55.0    70.0    85.0    95.0   110.0   125.0   325.0
$V1063.7  1064.9  1065.3  1065.5  1066.2  1067.1  1067.8  1068.2  1068.5
K       0       6                                       1
K1      CALCULATION OF SNYDER INFLOW HYDROGRAPH TO CHAMBERLAIN POND,(DER 66-11)
M       1       1    0.90            5.67                                   1
P              21.5     117     127     136     145
T                                                       1.0     0.5          0.0841
W   1.30    0.62
X   -1.5   -0.05     2.0
K       2       6                                       1
K1      COMBINED INFLOW HYDROGRAPH CHAMBERLAIN POND,(DER 66-11)
K       1       7                                       1
K1      ROUTING FLOW THROUGH CHAMBERLAIN POND,(DER 66-11)
Y                                       1       1
Y1    1                                                 -1055.0
$A   8.0    48.7    67.0   104.7
$E1041.0  1055.0  1060.0  1080.0
$$1055.0    62.0    3.08     1.5
$D1058.7    3.08     1.5    83.0
$L  22.0    40.0    83.0
$V1058.7  1059.1  1064.4
$B  59.0     0.5  1041.0    0.60  1055.0  1100.0
$B  59.0     0.5  1041.0    0.60  1055.0  1060.7
K       1       8                                       1
K1      CHANNEL ROUTING USING MODIFIED PULS,2200FT.D/S CHAMBERLAIN,JENNINGSVILLE
Y                                       1       1
Y1    1
Y6 0.030   0.040   0.035  1020.0  1039.0  2200.0 0.00941
Y7   0.0  1080.0   200.0  1060.0   450.0  1040.0   710.0  1020.0   720.0  1020.0
Y7 950.0  1040.0  1100.0  1060.0  1200.0  1080.0
K       1       9                                       1
K1      CHANNEL ROUTING USING MODIFIED PULS,4400FT.D/S CHAMBERLAIN,JENNINGSVILLE
Y                                       1       1
Y1    1
Y6 0.030   0.035   0.030  1009.0  1028.0  2200.0   0.005
Y7   0.0  1060.0    60.0  1040.0   120.0  1020.0   300.0  1009.0   310.0  1009.0
Y7 500.0  1020.0   700.0  1040.0   900.0  1060.0
K       1      11                                       1
K1      ROUTING FLOW THROUGH JENNINGS POND,(DER 66-12)
Y                                       1       1
Y1    1                                                 -1009.0
$A   5.0    36.7    83.6   155.2
$E1001.0  1009.0  1020.0  1040.0
$$1009.0    61.0    3.08     1.5
$D1011.4    3.08     1.5   208.0
$L  24.0    39.0    80.0    92.0   108.0   190.0   208.0
$V1011.4  1011.5  1011.7  1012.0  1012.1  1015.6  1017.6
K      99
```

COMPUTER INPUT
(Continued)
PAGE D4 OF 18

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS RATIO 1 .20	RATIO 2 .30	RATIO 3 .40	RATIO 4 .50	RATIO 5 .60	RATIO 6 .70	RATIO 7 .80	RATIO 8 .90	RATIO 9 1.00
HYDROGRAPH AT	1	.99	1	603.	904.	1206.	1507.	1808.	2110.	2411.	2713.	3014.
	(	2.56)	(	17.07)(	25.60)(	34.14)(	42.67)(	51.21)(	59.74)(	68.28)(	76.81)(	85.35)
			2	603.	904.	1206.	1507.	1808.	2110.	2411.	2713.	3014.
			(	17.07)(	25.60)(	34.14)(	42.67)(	51.21)(	59.74)(	68.28)(	76.81)(	85.35)
ROUTED TO	2	.99	1	432.	764.	1098.	1411.	1720.	2022.	2322.	2620.	2918.
	(	2.56)	(	12.22)(	21.63)(	31.09)(	39.95)(	48.70)(	57.26)(	65.75)(	74.20)(	82.64)
			2	432.	764.	1098.	1411.	1720.	2022.	2322.	2620.	2918.
			(	12.22)(	21.63)(	31.09)(	39.95)(	48.70)(	57.26)(	65.75)(	74.20)(	82.64)
ROUTED TO	3	.99	1	247.	816.	1264.	1606.	1752.	2008.	2323.	2617.	2920.
	(	2.56)	(	7.00)(	23.10)(	35.78)(	45.49)(	49.62)(	56.87)(	65.79)(	74.10)(	82.69)
			2	247.	816.	1264.	1606.	1752.	2008.	2323.	2617.	2920.
			(	7.00)(	23.10)(	35.78)(	45.49)(	49.62)(	56.87)(	65.79)(	74.10)(	82.69)
HYDROGRAPH AT	4	3.78	1	1703.	2555.	3407.	4259.	5110.	5962.	6814.	7665.	8517.
	(	9.79)	(	48.24)(	72.35)(	96.47)(	120.59)(	144.71)(	168.82)(	192.94)(	217.06)(	241.18)
			2	1703.	2555.	3407.	4259.	5110.	5962.	6814.	7665.	8517.
			(	48.24)(	72.35)(	96.47)(	120.59)(	144.71)(	168.82)(	192.94)(	217.06)(	241.18)
2 COMBINED	4	4.77	1	1890.	3351.	4528.	5562.	6693.	7795.	8910.	10019.	11130.
	(	12.35)	(	53.52)(	94.88)(	128.23)(	157.50)(	189.53)(	220.74)(	252.32)(	283.72)(	315.17)
			2	1890.	3351.	4528.	5562.	6693.	7795.	8910.	10019.	11130.
			(	53.52)(	94.88)(	128.23)(	157.50)(	189.53)(	220.74)(	252.32)(	283.72)(	315.17)
ROUTED TO	5	4.77	1	1293.	2408.	3682.	4894.	6079.	7223.	8360.	9473.	10572.
	(	12.35)	(	36.62)(	68.18)(	104.25)(	138.58)(	172.14)(	204.54)(	236.73)(	268.25)(	299.37)
			2	1293.	2408.	3682.	4894.	6079.	7223.	8360.	9473.	10572.
			(	36.62)(	68.18)(	104.25)(	138.58)(	172.14)(	204.54)(	236.73)(	268.25)(	299.37)
HYDROGRAPH AT	6	.90	1	532.	798.	1064.	1330.	1596.	1863.	2129.	2395.	2661.
	(	2.33)	(	15.07)(	22.60)(	30.14)(	37.67)(	45.21)(	52.74)(	60.28)(	67.81)(	75.34)
			2	532.	798.	1064.	1330.	1596.	1863.	2129.	2395.	2661.
			(	15.07)(	22.60)(	30.14)(	37.67)(	45.21)(	52.74)(	60.28)(	67.81)(	75.34)
2 COMBINED	6	5.67	1	1477.	2773.	4298.	5755.	7159.	8525.	9865.	11204.	12524.
	(	14.69)	(	41.84)(	78.53)(	121.72)(	162.96)(	202.71)(	241.41)(	279.36)(	317.27)(	354.65)
			2	1477.	2773.	4298.	5755.	7159.	8525.	9865.	11204.	12524.
			(	41.84)(	78.53)(	121.72)(	162.96)(	202.71)(	241.41)(	279.36)(	317.27)(	354.65)
ROUTED TO	7	5.67	1	1275.	2403.	3764.	5144.	6511.	7863.	9201.	10535.	11853.
	(	14.69)	(	36.11)(	68.05)(	106.58)(	145.67)(	184.38)(	222.65)(	260.55)(	298.32)(	335.63)
			2	1275.	2403.	15700.	17325.	17809.	19023.	19880.	20363.	20452.
			(	36.11)(	68.05)(	444.57)(	490.59)(	504.31)(	538.68)(	562.93)(	576.63)(	579.12)
ROUTED TO	8	5.67	1	1275.	2399.	3766.	5136.	6506.	7848.	9205.	10518.	11849.
	(	14.69)	(	36.09)(	67.94)(	106.64)(	145.48)(	184.22)(	222.24)(	260.65)(	297.83)(	335.52)

			2	1275.	2399.	14214.	15758.	16128.	17285.	18084.	18511.	18637.
				(36.09)(	67.94)(	402.49)(	446.21)(	456.70)(	489.46)(	512.08)(	524.16)(	527.73)
ROUTED TO	9	5.67	1	1274.	2399.	3761.	5135.	6495.	7856.	9198.	10525.	11827.
	(	14.69)	(	36.06)(	67.93)(	106.49)(	145.36)(	183.92)(	222.44)(	260.47)(	298.05)(	334.92)
			2	1274.	2399.	14092.	15703.	16407.	17673.	18621.	19223.	19458.
				(36.06)(	67.93)(	399.04)(	444.66)(	464.61)(	500.44)(	527.29)(	544.34)(	550.99)
ROUTED TO	11	5.67	1	1213.	2299.	3619.	4970.	6315.	7660.	8993.	10301.	11616.
	(	14.69)	(	34.34)(	65.09)(	102.48)(	140.73)(	178.81)(	216.90)(	254.66)(	291.68)(	328.94)
			2	1213.	2299.	10511.	11876.	12211.	13351.	14166.	14642.	14786.
				(34.34)(	65.09)(	297.64)(	336.30)(	345.77)(	378.05)(	401.15)(	414.60)(	418.70)

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1135.00	1135.00	1136.10
STORAGE	0.	0.	51.
OUTFLOW	0.	0.	35.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.20	1136.88	.78	89.	432.	9.40	41.80	0.00
.30	1137.19	1.09	104.	764.	10.80	41.40	0.00
.40	1137.40	1.30	114.	1098.	12.00	41.20	0.00
.50	1137.56	1.46	122.	1411.	12.80	41.00	0.00
.60	1137.71	1.61	130.	1720.	13.40	41.00	0.00
.70	1137.84	1.74	136.	2022.	14.00	41.00	0.00
.80	1137.96	1.86	143.	2322.	14.60	41.00	0.00
.90	1138.08	1.98	149.	2620.	15.00	41.00	0.00
1.00	1138.19	2.09	154.	2918.	15.40	41.00	0.00

PLAN 2 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1135.00	1135.00	1136.10
STORAGE	0.	0.	51.
OUTFLOW	0.	0.	35.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.20	1136.88	.78	89.	432.	9.40	41.80	0.00
.30	1137.19	1.09	104.	764.	10.80	41.40	0.00
.40	1137.40	1.30	114.	1098.	12.00	41.20	0.00
.50	1137.56	1.46	122.	1411.	12.80	41.00	0.00
.60	1137.71	1.61	130.	1720.	13.40	41.00	0.00
.70	1137.84	1.74	136.	2022.	14.00	41.00	0.00
.80	1137.96	1.86	143.	2322.	14.60	41.00	0.00
.90	1138.08	1.98	149.	2620.	15.00	41.00	0.00
1.00	1138.19	2.09	154.	2918.	15.40	41.00	0.00

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1100.00	1100.00	1120.00
STORAGE	0.	0.	50.
OUTFLOW	0.	0.	259.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.20	1118.51	0.00	44.	247.	0.00	43.80	0.00
.30	1120.65	.65	53.	816.	3.00	41.80	0.00
.40	1120.96	.96	55.	1264.	3.80	41.20	0.00
.50	1121.17	1.17	56.	1606.	4.60	40.80	0.00
.60	1121.25	1.25	56.	1752.	5.00	41.00	0.00
.70	1121.39	1.39	57.	2008.	5.40	41.00	0.00
.80	1121.55	1.55	58.	2323.	5.80	41.00	0.00
.90	1121.70	1.70	59.	2617.	6.00	41.00	0.00
1.00	1121.84	1.84	60.	2920.	6.40	41.00	0.00

PLAN 2 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1100.00	1100.00	1120.00
STORAGE	0.	0.	50.
OUTFLOW	0.	0.	259.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.20	1118.51	0.00	44.	247.	0.00	43.80	0.00
.30	1120.65	.65	53.	816.	3.00	41.80	0.00
.40	1120.96	.96	55.	1264.	3.80	41.20	0.00
.50	1121.17	1.17	56.	1606.	4.60	40.80	0.00
.60	1121.25	1.25	56.	1752.	5.00	41.00	0.00
.70	1121.39	1.39	57.	2008.	5.40	41.00	0.00
.80	1121.55	1.55	58.	2323.	5.80	41.00	0.00
.90	1121.70	1.70	59.	2617.	6.00	41.00	0.00
1.00	1121.84	1.84	60.	2920.	6.40	41.00	0.00

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1063.60	1063.60	1063.70
STORAGE	297.	297.	305.
OUTFLOW	0.	0.	0.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.20	1067.53	3.83	647.	1293.	16.20	43.60	0.00
.30	1068.69	4.99	765.	2408.	18.40	43.00	0.00
.40	1069.40	5.70	839.	3682.	23.60	42.60	0.00
.50	1069.95	6.25	899.	4894.	31.00	42.40	0.00
.60	1070.42	6.72	952.	6079.	33.60	42.20	0.00
.70	1070.85	7.15	1000.	7223.	34.40	42.00	0.00
.80	1071.25	7.55	1046.	8360.	35.00	42.00	0.00
.90	1071.62	7.92	1089.	9473.	35.40	42.00	0.00
1.00	1071.97	8.27	1130.	10572.	35.60	42.00	0.00

PLAN 2 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1063.60	1063.60	1063.70
STORAGE	297.	297.	305.
OUTFLOW	0.	0.	0.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.20	1067.53	3.83	647.	1293.	16.20	43.60	0.00
.30	1068.69	4.99	765.	2408.	18.40	43.00	0.00
.40	1069.40	5.70	839.	3682.	23.60	42.60	0.00
.50	1069.95	6.25	899.	4894.	31.00	42.40	0.00
.60	1070.42	6.72	952.	6079.	33.60	42.20	0.00
.70	1070.85	7.15	1000.	7223.	34.40	42.00	0.00
.80	1071.25	7.55	1046.	8360.	35.00	42.00	0.00
.90	1071.62	7.92	1089.	9473.	35.40	42.00	0.00
1.00	1071.97	8.27	1130.	10572.	35.60	42.00	0.00

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1055.00	1055.00	1058.70
STORAGE	357.	357.	561.
OUTFLOW	0.	0.	1359.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.20	1058.55	0.00	551.	1275.	0.00	44.60	0.00
.30	1060.11	1.41	652.	2403.	5.00	43.80	0.00
.40	1061.47	2.77	745.	3764.	6.60	43.40	0.00
.50	1062.61	3.91	825.	5144.	7.40	43.00	0.00
.60	1063.59	4.89	897.	6511.	8.20	42.80	0.00
.70	1064.47	5.77	961.	7863.	8.60	42.60	0.00
.80	1065.27	6.57	1021.	9201.	9.20	42.60	0.00
.90	1066.01	7.31	1078.	10535.	9.60	42.40	0.00
1.00	1066.70	8.00	1132.	11853.	9.80	42.40	0.00

PLAN 2 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1055.00	1055.00	1058.70
STORAGE	357.	357.	561.
OUTFLOW	0.	0.	1359.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.20	1058.55	0.00	551.	1275.	0.00	44.60	0.00
.30	1060.11	1.41	652.	2403.	5.00	43.80	0.00
.40	1061.02	2.32	714.	15700.	1.76	43.00	42.40
.50	1061.56	2.86	751.	17325.	1.62	42.40	41.60
.60	1061.35	2.65	737.	17809.	1.45	41.80	41.20
.70	1061.82	3.12	770.	19027.	1.49	41.60	41.00
.80	1062.09	3.39	788.	19880.	1.55	41.40	40.80
.90	1062.15	3.45	793.	20363.	1.59	41.20	40.60
1.00	1062.04	3.34	785.	20452.	1.40	41.00	40.40

PLAN 1 STATION 8

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
.20	1275.	1023.8	44.60
.30	2399.	1024.9	43.80
.40	3766.	1025.9	43.40
.50	5138.	1026.7	43.00
.60	6506.	1027.3	42.80
.70	7848.	1027.9	42.80
.80	9205.	1028.4	42.60
.90	10518.	1028.9	42.40
1.00	11849.	1029.3	42.40

PLAN 2 STATION 8

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
.20	1275.	1023.8	44.60
.30	2399.	1024.9	43.80
.40	14214.	1030.0	43.00
.50	15758.	1030.4	42.40
.60	16128.	1030.5	41.80
.70	17285.	1030.7	41.60
.80	18084.	1030.9	41.40
.90	18511.	1031.0	41.20
1.00	18637.	1031.1	41.20

PLAN 1 STATION 9

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
.20	1274.	1012.7	44.80
.30	2399.	1013.7	44.00
.40	3761.	1014.7	43.40
.50	5133.	1015.4	43.20
.60	6495.	1016.1	43.00
.70	7856.	1016.6	42.80
.80	9198.	1017.1	42.60
.90	10525.	1017.5	42.60
1.00	11827.	1017.9	42.40

PLAN 2 STATION 9

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
.20	1274.	1012.7	44.80
.30	2399.	1013.7	44.00
.40	14092.	1018.5	43.20
.50	15703.	1018.9	42.60
.60	16407.	1019.1	42.00
.70	17673.	1019.4	41.80
.80	18621.	1019.6	41.60
.90	19223.	1019.7	41.40
1.00	19458.	1019.8	41.20

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

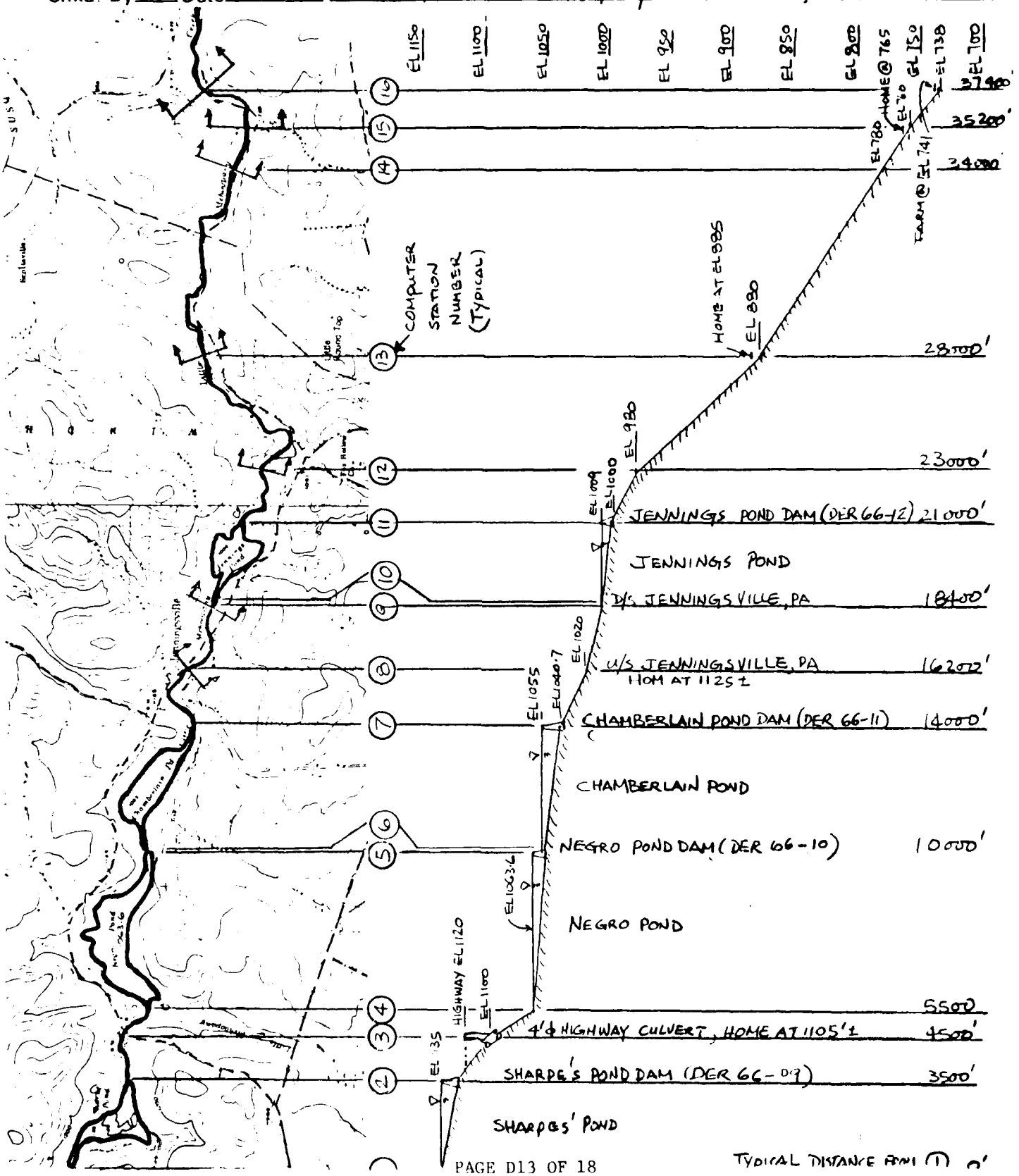
	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1009.00	1009.00	1011.40
STORAGE	147.	147.	246.
OUTFLOW	0.	0.	699.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.20	1012.18	.78	282.	1213.	6.60	45.60	0.00
.30	1013.19	1.79	333.	2299.	9.00	44.60	0.00
.40	1014.10	2.70	382.	3619.	10.40	44.00	0.00
.50	1014.87	3.47	427.	4970.	11.20	43.60	0.00
.60	1015.54	4.14	467.	6315.	11.80	43.40	0.00
.70	1016.14	4.74	505.	7660.	12.40	43.20	0.00
.80	1016.67	5.27	541.	8993.	12.60	43.00	0.00
.90	1017.17	5.77	575.	10301.	12.80	43.00	0.00
1.00	1017.64	6.24	608.	11616.	13.00	42.80	0.00

PLAN 2 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1009.00	1009.00	1011.40
STORAGE	147.	147.	246.
OUTFLOW	0.	0.	699.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.20	1012.18	.78	282.	1213.	6.60	45.60	0.00
.30	1013.19	1.79	333.	2299.	9.00	44.60	0.00
.40	1017.25	5.85	580.	10511.	9.00	43.40	0.00
.50	1017.73	6.33	615.	11876.	9.80	42.80	0.00
.60	1017.84	6.44	623.	12211.	10.40	42.20	0.00
.70	1018.23	6.83	651.	13551.	11.00	42.00	0.00
.80	1018.49	7.09	671.	14166.	11.40	41.80	0.00
.90	1018.64	7.24	683.	14642.	11.80	41.60	0.00
1.00	1018.69	7.29	686.	14786.	12.20	41.60	0.00


EL 1150
EL 1100
EL 1050
EL 1000
EL 950
EL 900
EL 850
EL 800
EL 765
EL 750
EL 738
EL 700
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
COMPUTER STATION NUMBER (TYPICAL)
HOME AT EL 885
EL 890
EL 780
HOME @ 765
EL 741
FARM @ EL 741
37900
35200
34000
28000'
23000'
EL 980
EL 1009
EL 1000
JENNINGS POND DAM (DER 66-12) 21000'
JENNINGS POND
D/S JENNINGSVILLE, PA 18400'
EL 1020
EL 1040.7
U/S JENNINGSVILLE, PA 16200'
HOM AT 1125±
EL 1055
CHAMBERLAIN POND DAM (DER 66-11) 14000'
CHAMBERLAIN POND
NEGRO POND DAM (DER 66-10) 10000'
EL 1036
NEGRO POND
HIGHWAY EL 1120
EL 1100
5500
4'ϕ HIGHWAY CULVERT, HOME AT 1105'±
4500'
EL 1135
SHARPE'S POND DAM (DER 66-09) 3500'
SHARPES' POND
TYPICAL DISTANCE APPX (1) 0'

DOWNSTREAM SECTIONS (LOOKING D/S)

STATION 1 SHARPE'S POND LAKE EL 1125 (SEE SHEET 5 OF 6 FOR CAPACITY)

STATION 2 SHARPE'S POND DAM (DER 66-09)

STATION 3 4'ϕ CULVERT, HOME BASEMENT @EL 1105± (SEE SHEET 6 FOR CAPACITY)

STATION 4 NEGRO POND

STATION 5 NEGRO POND DAM (DER 66-10)

STATION 6 CHAMBERLAIN POND

STATION 7 CHAMERLAIN POND DAM (DER 66-11)

SECTION 8 U/S JENNINGSVILLE CHANNEL SECTION

DISTANCE, FT	ELEVATION	
0	1080	
200	1060	n=0.030
450	1040	
710	1020	n=0.04
720	1020	
950	1040	
1100	1060	n=0.035
1200	1080	

L = 2200 FT

$S = \frac{1040.7 - 1020}{2200}$

$= 0.00941$

SECTION 9 D/S JENNINGSVILLE CHANNEL SECTION

DISTANCE, FT	ELEVATION	
0	1060	
60	1040	n=0.030
120	1020	
300	1009	n=0.035
310	1009	
500	1020	
700	1040	n=0.030
900	1060	

L = 2200 FT

$S = \frac{1020 - 1009}{2200}$

$= 0.0050$

STATION 10 JENNINGS POND

STATION 11 JENNINGS POND DAM (DER 66-12)

STATION 12 2000' D/S FROM JENNINGS POND

DISTANCE, FT	ELEVATION	
0	1040	
100	1020	n=0.035
300	1000	
400	980	n=0.035
410	980	
700	1000	
880	1020	n=0.035
1000	1040	

L = 2000' FT

$S = \frac{1000 - 980}{2000}$

$= 0.010$

STATION 13 5000' D/S FROM JENNINGS POND HOME @ EL 885

DISTANCE, FT	ELEVATION	
0	940	
50	920	n=0.035
150	900	
220	880	n=0.035
230	880	
380	900	
420	920	n=0.035
450	940	

L = 5000 FT

$S = \frac{980 - 880}{5000}$

$= 0.020$

STATION 14 13000' D/S FROM JENNINGS POND

DISTANCE, FT	ELEVATION	
0	840	
50	820	n=0.035
100	800	
200	780	n=0.035
210	780	
350	800	
430	820	n=0.035
500	840	

L = 6000 FT

$S = \frac{880 - 780}{6000}$

$= 0.016667$

STATION 15 14200 FT D/S FROM JENNINGS POND, HOME AT ELEV. 765

DISTANCE, FT	ELEVATION	
0	820	
50	800	n=0.035
100	780	
350	760	n=0.035
360	760	
650	780	
700	800	n=0.035
800	820	

L = 1200 FT

$S = \frac{780-760}{1200}$

$= 0.016667$

STATION 16 16,400 FT D/S FROM JENNINGS POND, FARM AT ELEV. 741

DISTANCE FT	ELEVATION	
0	780	
100	760	n=0.035
500	740	
510	738	n=0.035
520	738	
550	740	
600	760	n=0.035
700	780	

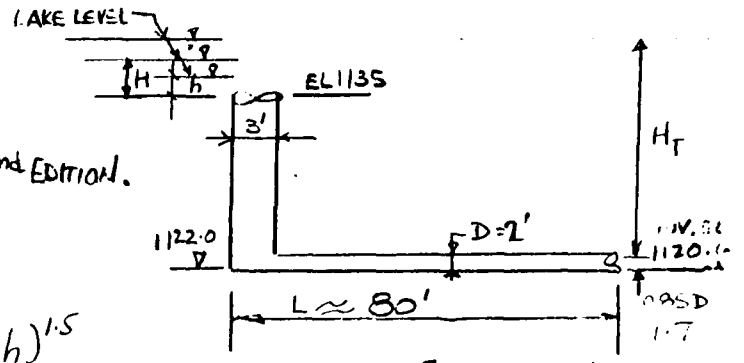
L = 2200 FT

$S = \frac{760-738}{2200}$

$= 0.010$

NOTES (1)

SPILLWAY DISCHARGE CAPACITY



REFERENCE: DESIGN OF SMALL DAM 2nd EDITION.

FOR WEIR FLOW CONTROL

$$Q_w = C L h^{1.5} = (3.2)(\pi)(3)(h)^{1.5}$$
$$= 30.16\, h^{1.5} = 30.16\,(\text{LAKE ELEV} - 1135)^{1.5} \quad -(\text{EQ 1})$$

FOR ORIFICE FLOW CONTROL

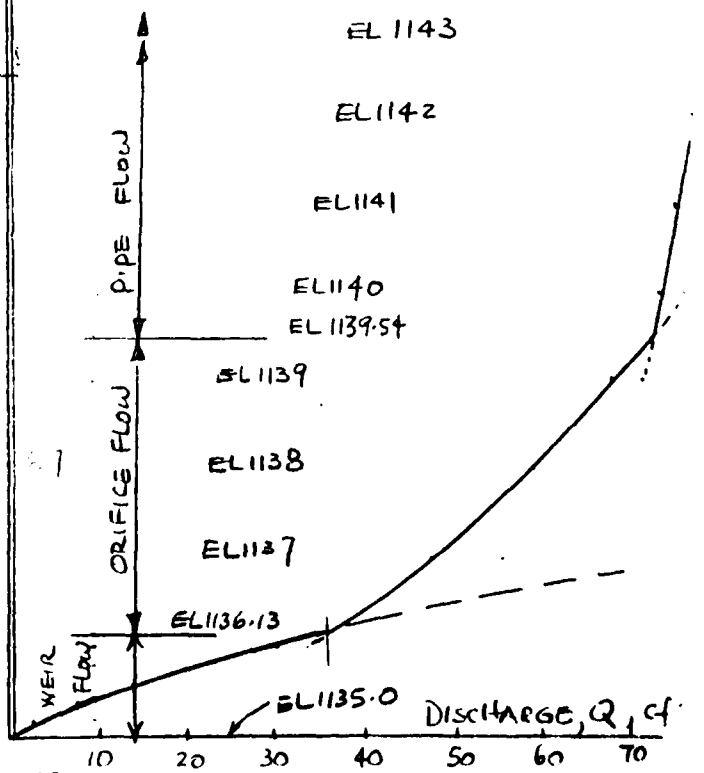
$$Q_o = C_o A \sqrt{2gH} = (0.6)\left(\frac{\pi 3^2}{4}\right)(64.4)^{1/2}\sqrt{H} = 34.04\sqrt{H} = 34.04\sqrt{\text{LAKE EL} - 11}$$
(EQ 2)

FOR PIPE FLOW CONTROL

$$H_T = \left[\frac{2.5204(1+K_e)}{D^4} + \frac{466.18\, n^2 L}{D^{16/3}}\right]\left(\frac{Q_p}{10}\right)^2 = \left[\frac{2.5204(1.5)}{(2)^4} + \frac{(466.18)(0.013)^2(30)}{(2)^{16/3}}\right]\left(\frac{Q_p}{10}\right)$$

$$Q_p = 15.96\sqrt{H_T} = 15.96\sqrt{\text{LAKE EL.} - 1120.6 - 0.85(2)} = 15.96\sqrt{\text{LAKE EL} - 1118.9}\ (\text{EQ}$$

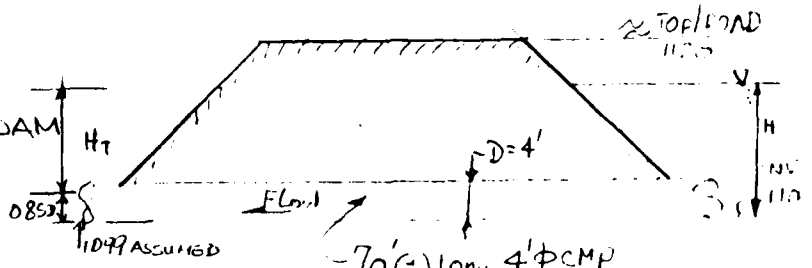
LAKE ELEVATION	Q_w cfs	Q_o cfs	Q_p cfs	SPILLWAY CAPACITY Q, cfs
1135.0	0	0	0	0
1135.2	2.7			2.7
1135.4	7.6			7.6
1135.6	14.0			14.0
1135.8	21.6			21.6
1136.0	30.2	34.0		30.2
1136.13	36.2	36.2		36.2
1137.0	85.3	48.1		48.1
1138.0		59.0		59.0
1139.0		68.1	71.6	68.1
→ 1139.54		72.5	72.5	72.5
1140.0		76.1	73.3	73.3
1141.0			75.0	75.0
1142.0			76.7	76.7
1143.0			78.3	78.3



C

ROAD CULVERT CAPACITY

REFERENCE : DESIGN OF SMALL DAM
2nd EDITION



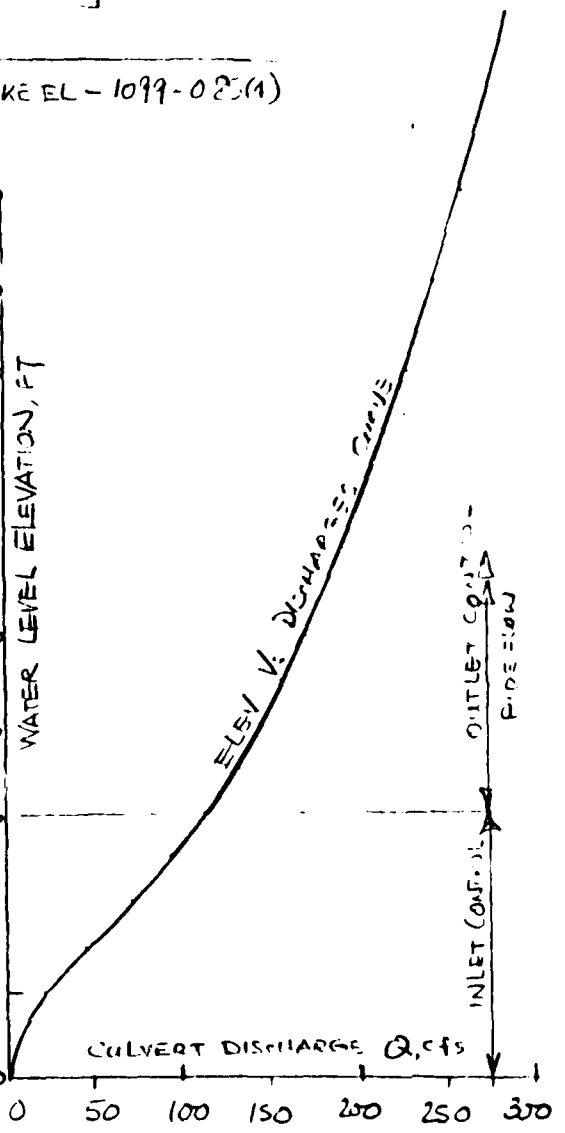
FOR PIPE FLOW CONTROL

$$H_T = \left[\frac{(2.5204)(1+K_e)}{D^4} + \frac{(466.18)(n)^2(L)}{D^{16/3}}\right]\left(\frac{Q_p}{10}\right)^2$$

$$\left[\frac{(2.5204)(1.5)}{(4)^4} + \frac{(466.18)(0.024)^2(70)}{(4)^{16/3}}\right]\left(\frac{Q_p}{10}\right)^2$$

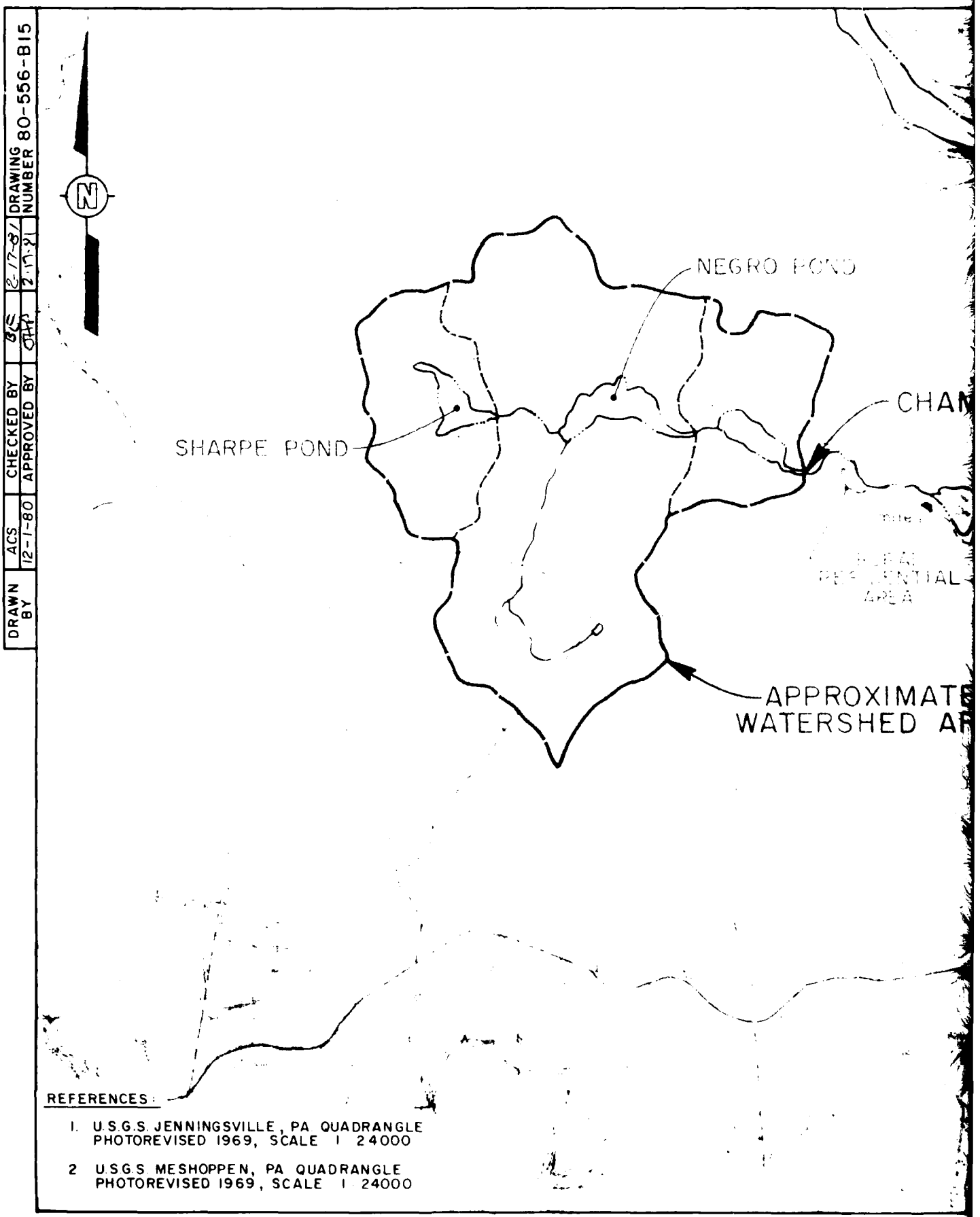
$$Q_p = 61.63\sqrt{H_T} = 61.63\sqrt{\text{LAKE EL} - 1099 - 0.85(4)}$$
$$= 61.63\sqrt{\text{LAKE EL} - 1102.4}$$

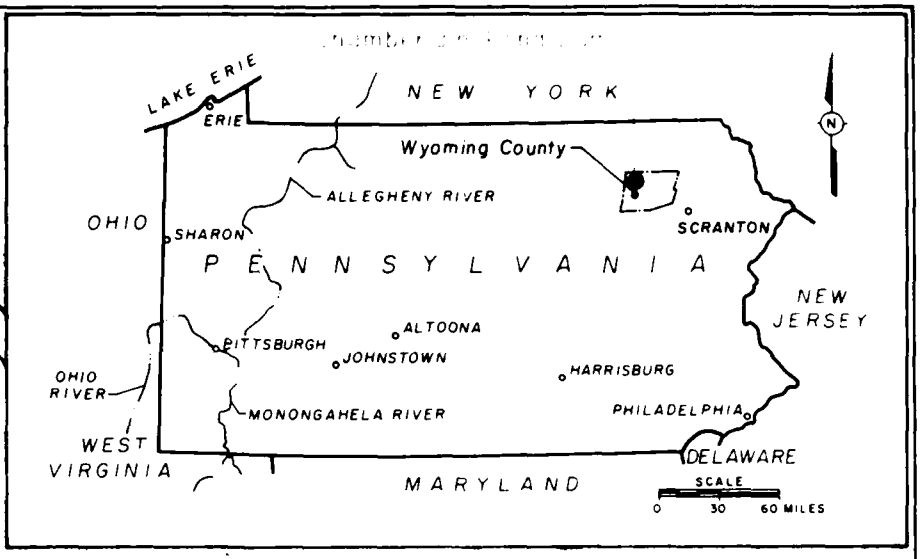
LAKE ELEVATION (FT)	FIG 8.4 Page of REF: INLET CONTROL H FT	H D	Q_i cfs	OUTLET CONTROL Q_p cfs	CULVERT CAPACITY Q cfs
1100	0	0	0	0	0
1102	2	0.5	23		23
1103	3	0.75	46		46
1104	4	1.00	72	78	72
1105	5	1.25	95	99	95
1106	6	1.5	117	117	117
1107	7	1.75	133	132	132
1108	8	2.0	150	146	146
1109	9			158	158
1110	10			170	170
1112	12			191	191
1114	14			210	210
1116	16			227	227
1118	18			243	243
1120	20			259	259
1122	22			273	273
1124	24			286	286



APPENDIX E

PLATES





ND

CHAMBERLAIN POND DAM

KEY PLAN

mile 3

LITTLE MEHOOPANY CREEK

mile 5

NORTH MEHOOPANY

mile 4

mile 2

mile 6

RURAL RESIDENTIAL AREA

SUSQUEHANNA RIVER

ROXIMATE RSHED AREA

SCALE

0 2000 4000 6000 8000 10000 FEET

PLATE I

CHAMBERLAIN POND DAM
VICINITY, FLOOD PLAIN & WATERSHED MAP

DAPPOLONIA

DRAWN BY	CHECKED BY	DRAWING NUMBER
ACS 1-5-80	APPROVED BY	80-556-A23

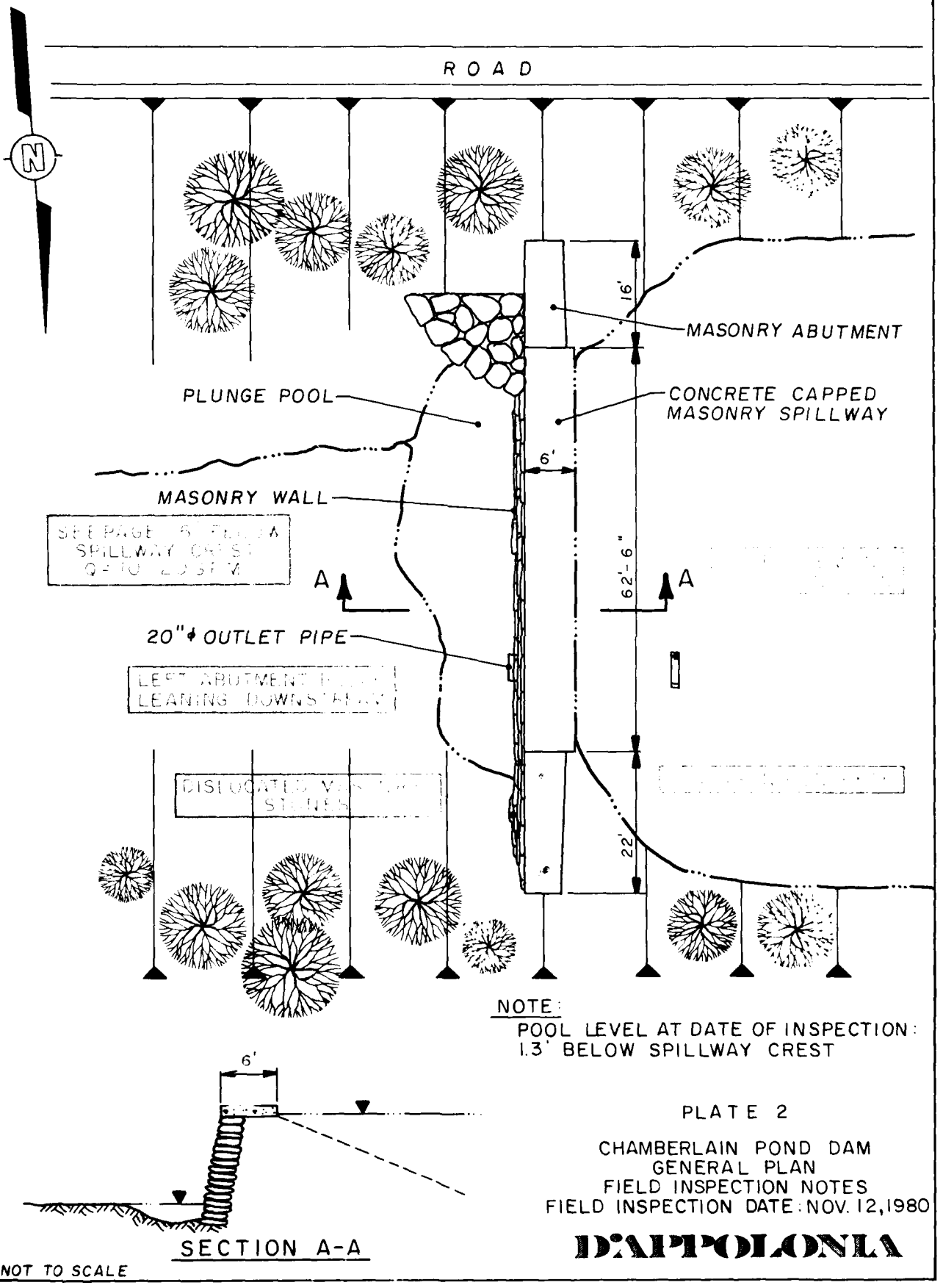
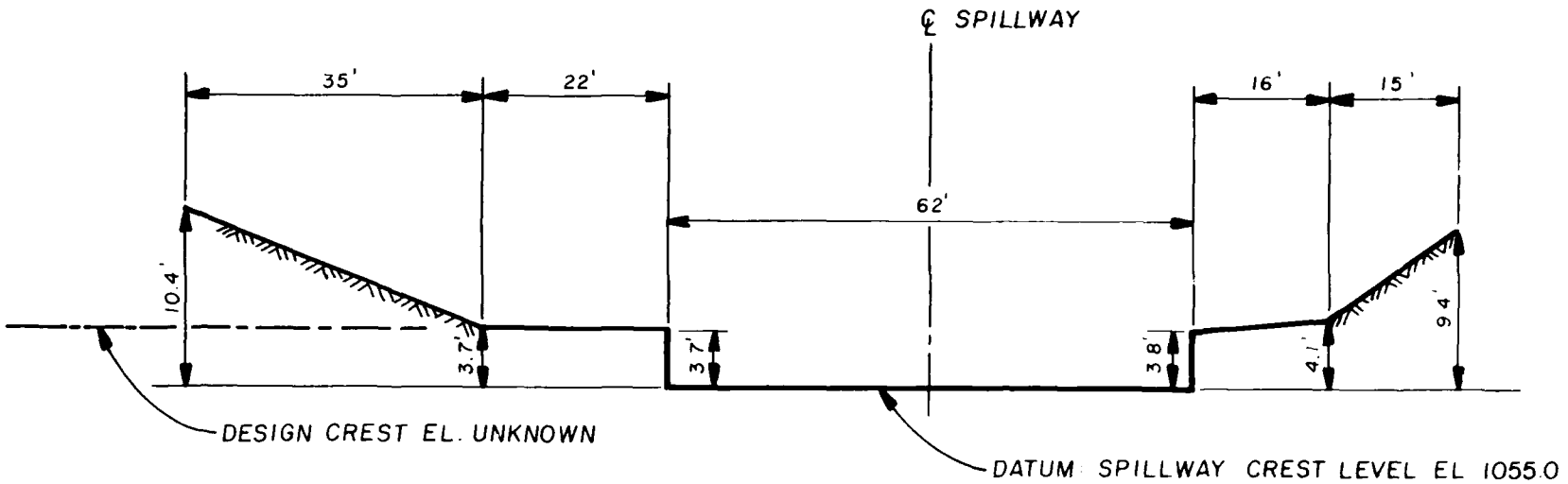


PLATE 2

CHAMBERLAIN POND DAM
GENERAL PLAN
FIELD INSPECTION NOTES
FIELD INSPECTION DATE: NOV. 12, 1980

DAPPOLONIA

DRAWN BY	sh	CHECKED BY	BC	3 3	DRAWING NUMBER 80-556-A 24
	12-22-80	APPROVED BY	JHP	2 17 81	



DAM CREST PROFILE
(LOOKING DOWNSTREAM)

NOTES:

1. DAM CREST WAS SURVEYED RELATIVE TO SPILLWAY CREST.
2. DATUM ELEVATION PER U.S.G.S. MAPS.

PLATE 3

CHAMBERLAIN POND DAM
DAM CREST SURVEY
FIELD INSPECTION DATE NOV. 21, 1980

DALTON, PIOLA

APPENDIX F

REGIONAL GEOLOGY

REGIONAL GEOLOGY
NEGRO POND, SHARPE'S POND, CHAMBERLAIN POND AND JENNINGS POND DAMS

The Negro Pond, Sharpe's Pond, Chamberlain Pond, and Jennings Pond dams are located in the glaciated low plateaus section of the Appalachian Plateau physiographic province, characterized as a mature glaciated plateau of moderate relief.

The geologic structure consists of a series of northeast trending folds (approximately N70°E) which plunge gently to the southwest. The dip of the limbs of the folds in the vicinity of the dams is less than five degrees, with the southeast limb steeper than the northwest limb. The dams are located south of the Wilmot Anticline. In general, the discontinuity trends are northeast and northwest.

The stratigraphy consists of glacial till which will range in thickness from very thin to approximately 200 feet. The glacial till is underlain by the Devonian Chemung Formation, which is approximately 475 feet thick in this area. The Chemung Formation is marine in origin, consisting of green-gray sandstone, multicolored shale, and sandy shale. The shale strata tend to weather rapidly when exposed.

DRAWN BY	CHECKED BY	DRAWING NUMBER
ACS 1-2-81	APPROVED BY	80-556-A3

GEOLOGY MAP

REFERENCE

GEOLOGIC MAP OF PENNSYLVANIA PREPARED BY COMMONWEALTH OF PENNA, DEPARTMENT OF ENVIRONMENTAL RESOURCES, DATED 1960
SCALE 1 250,000

DAPPOLONIA

DRAWN BY	ACS	CHECKED BY		2-17-81	DRAWING NUMBER 80-556-A4
	1-2-81	APPROVED BY		2-17-81	

PENNSYLVANIAN

APPALACHIAN PLATEAU

Pa — Allegheny Group

Pp — Pottsville Group

ANTHRACITE REGION

Pp — Pottsville Formation

MISSISSIPPIAN

Mmc — Mauch Chunk Formation

Mp — Pocono Group

DEVONIAN

UPPER

CENTRAL AND EASTERN PENNSYLVANIA

Dos — Oswayo Formation

Dck — Catskill Formation

Ds — Susquehanna Group

Marine beds

REFERENCE

GEOLOGIC MAP OF PENNSYLVANIA PREPARED BY COMMONWEALTH OF PENNA, DEPARTMENT OF ENVIRONMENTAL RESOURCES, DATED 1960
SCALE : 250,000

GEOLOGY MAP LEGEND

D'APPOLONIA